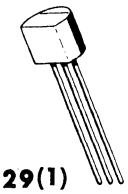
2N4409 (SILICON)
2N4410



CASE 29(1)
(TO-92)

NPN silicon epitaxial transistors designed for driving neon display tubes. Features one-piece, injection-molded plastic package for high reliability.

MAXIMUM RATINGS (T_A = 25°C unless otherwise noted)

Rating	Symbol	2N4409	2N4410	Unit
Collector-Emitter Voltage	V_{CEO}	50	80	Vdc
Collector-Base Voltage	V_{CB}	80	120	Vdc
Emitter-Base Voltage	V_{EB}	5.0	5.0	Vdc
Collector Current - Continuous	I_C	250		mAdc
Total Device Dissipation @ T_A = 25°C Derate above 25°C	P_D	310 2.81		mW mW/°C
Operating & Storage Junction Temperature Range	T_J, T_{stg}	-55 to +135		°C

THERMAL RESISTANCE: $\theta_{JA} = 0.357$ °C/mW

ELECTRICAL CHARACTERISTICS (T_A = 25°C unless otherwise noted)

Characteristic		Symbol	Min	Max	Unit
OFF CHARACTERISTICS					
Collector-Emitter Breakdown Voltage (I_C = 1 mAdc, I_B = 0)	2N4409 2N4410	BV_{CEO}	50 80	— —	Vdc
Collector-Emitter Breakdown Voltage (I_C = 500 μAdc, V_{BB} = 5 Vdc, R_{BE} = 8.2 k ohms)	2N4409 2N4410	BV_{CEX}	80 120	— —	Vdc
Collector-Base Breakdown Voltage (I_C = 10 μAdc, I_C = 0)	2N4409 2N4410	BV_{CBO}	80 120	— —	Vdc
Emitter-Base Breakdown Voltage (I_E = 10 μAdc, I_C = 0)		BV_{EBO}	5.0	—	Vdc
Collector Cutoff Current		I_{CBO}			μAdc
(V_{CB} = 60 Vdc, I_E = 0)	2N4409		—	0.01	
(V_{CB} = 60 Vdc, I_E = 0, T_A = 100°C)	2N4409		—	1.0	
(V_{CB} = 100 Vdc, I_E = 0)	2N4410		—	0.01	
(V_{CB} = 100 Vdc, I_E = 0, T_A = 100°C)	2N4410		—	1.0	
Emitter Cutoff Current (V_{BE} = 4 Vdc, I_C = 0)		I_{EBO}	—	0.1	μAdc
ON CHARACTERISTICS					
DC Current Gain		h_{FE}			—
(I_C = 1 mAdc, V_{CE} = 1 Vdc)			60	400	
(I_C = 10 mAdc, V_{CE} = 1 Vdc)			60	—	
Collector-Emitter Saturation Voltage (I_C = 1 mAdc, I_B = 0.1 mAdc)		$V_{CE(sat)}$	—	0.2	Vdc
Base-Emitter Saturation Voltage (I_C = 1 mAdc, I_B = 0.1 mAdc)		$V_{BE(sat)}$	—	0.8	Vdc
Base-Emitter On Voltage (I_C = 1 mAdc, V_{CE} = 5 Vdc)		$V_{BE(on)}$	—	0.8	Vdc

DYNAMIC CHARACTERISTICS

Current-Gain — Bandwidth Product (I_C = 10 mAdc, V_{CE} = 10 Vdc, f = 30 MHz)	f_T	60	300	MHz
Collector-Base Capacitance (V_{CB} = 10 Vdc, I_E = 0, f = 100 kHz, emitter guarded)	C_{cb}	—	12	pF
Emitter-Base Capacitance (V_{BE} = 0.5 Vdc, I_C = 0, f = 100 kHz, collector guarded)	C_{eb}	—	50	pF

TYPICAL DC CHARACTERISTICS

FIGURE 1 — CURRENT GAIN

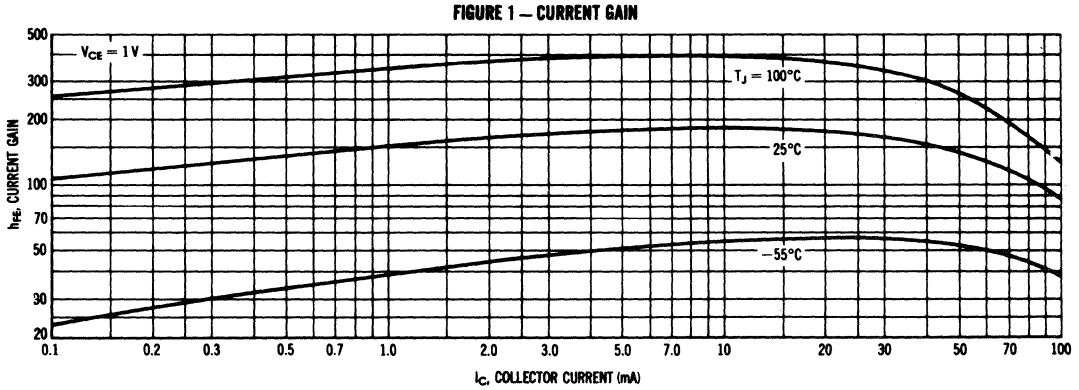


FIGURE 2 — SATURATION VOLTAGES

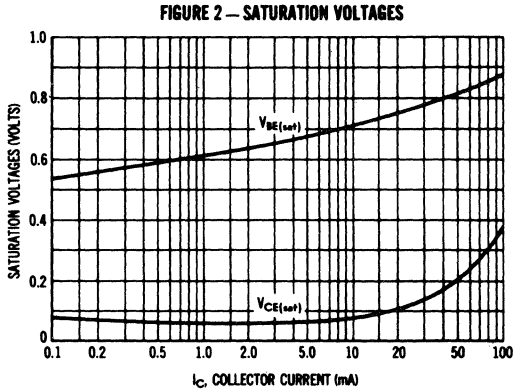


FIGURE 3 — TEMPERATURE COEFFICIENTS

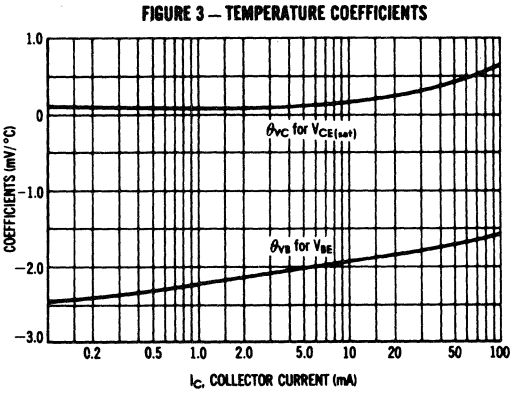


FIGURE 4 — CUTOFF CURRENT

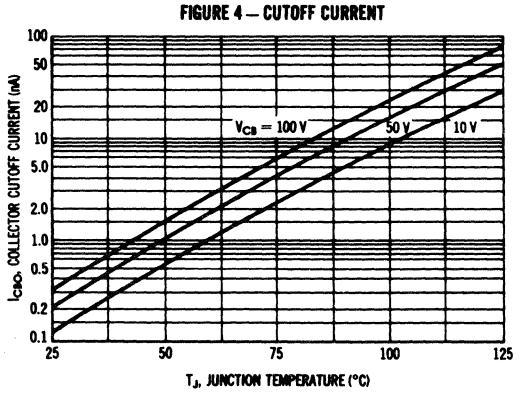
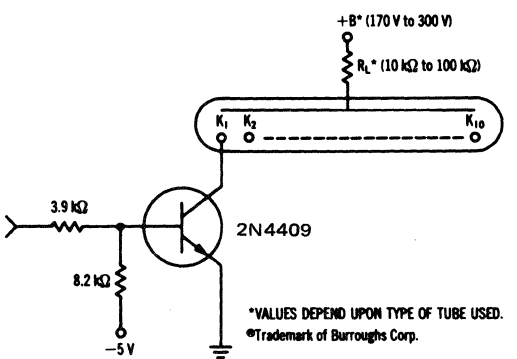


FIGURE 5 — TYPICAL NIXIE® DRIVER APPLICATION



*VALUES DEPEND UPON TYPE OF TUBE USED.
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